

Listing of Claims

1. (Currently amended) A material composition comprising:
ribbons, fibrils or fibres, wherein each of the ribbons, fibrils or fibres has an antiparallel arrangement of peptides in a β - sheet tape-like substructure at physiological pH and physiological salt concentrations, wherein each peptide comprises a net -2 or a +2 charge, and wherein the peptide is are selected from P11-3 and P11-5; and
a physiological concentration of salt,
wherein the composition is at a physiological pH, and wherein the peptide is present at a concentration of greater than 15 mg/ml in the composition.
2. (Canceled)
3. (Currently Amended) The material material composition to claim 1, wherein the material material composition a self assembling peptide (SAP), wherein the SAP forms a tape in an aqueous medium and is made up of 3 or more polar/neutral amino acids and a plurality of charged amino acids.
4. (Currently Amended) The material composition according to claim 3, wherein the ratio of total amino acids to charged amino acids is from 11:1 to 11:3.
5. (Currently Amended) The material composition according to claim 3, wherein the polar/neutral amino acids comprise glutamine, serine, asparagine, glutamic acid, ornithine, cysteine, lysine, histidine or threonine.
6. (Currently Amended) The material composition according to claim 3, wherein the amino acids are positively charged and form a gel at a pH of less than or equal to a neutral pH.

7. (Withdrawn and Currently Amended) The material composition according to claim 3, wherein the amino acids are negatively charged and form a gel at a pH of greater than or equal to a neutral pH.

8. (Canceled)

9. (Withdrawn and Currently Amended) The material composition according to claim 3, wherein the amino acid chain is extended to include a bioactive peptide sequence.

10. (Withdrawn and Currently Amended) The material composition according to claim 3, wherein the amino acid chain is attached to a therapeutically active molecule.

11. (Currently Amended) The material composition according to claim 1, wherein the material composition comprises a SAP which forms ribbons and/or fibrils in an aqueous solution and wherein the SAP has a primary structure in which at least 50% of the amino acids comprise an alternating structure of polar and apolar amino acids.

12. (Withdrawn and Currently Amended) The material composition according to claim 11, wherein the polar amino acids include from 1 to 3 net charged amino acids per 11 amino acids.

13. – 16. (Canceled)

17. (Currently Amended) The material composition according to claim 11, wherein the material composition comprises a self assembling peptide (SAP) wherein the SAP forms a tape in an aqueous medium and is made up of 3 or more polar/neutral amino acids and a plurality of charged amino acids.

18. (Canceled)

19. (Currently Amended) The material composition according to claim 11, wherein the apolar amino acids comprise phenylalanine, tryptophan, valine, leucine, isoleucine or methionine.

20. (Withdrawn and Currently Amended) The material composition according to claim 17, wherein the amino acid chain is extended to include a bioactive peptide sequence.

21. (Withdrawn and Currently Amended) The material composition according to claim 17, wherein the amino acid chain is attached to a therapeutically active molecule.

22. (Canceled)

23. (Currently Amended) The material composition according to claim 11, wherein the SAP is soluble in a highly ionic medium.

24. (Currently Amended) The material composition according to claim 23, wherein the SAP comprises a ratio of net charged amino acids to total amino acids of from 1:11 to 4:11.

25. – 35. (Canceled)

36. (Withdrawn and Currently Amended) The material composition according to claim 1, wherein the persistence length of the ribbons, fibrils or fibres is from 20 nm - 70 μ m.

37. (Withdrawn and Currently Amended) The material composition according to claim 36, wherein the peptide is a P11-3 variant.

38. (Currently Amended) The material composition according to claim 1, wherein the material composition substantially comprises ribbons, fibrils, or fibres.

39. - 40. (Cancelled)

41. (Currently Amended) The material composition according to claim 38, wherein the material composition substantially comprises fibrils, and wherein the fibrils are comprised in a network of fibrils interconnected at fibre-like junctions.

42. (Withdrawn and Currently Amended) The material composition according to claim 1, wherein a solution of the material composition has a nematic transition occurring at $C_{IN} = 0.9$ mM.

43. (Withdrawn and Currently Amended) The material composition according to claim 38, wherein the fibrils or fibres are in the form of a nematic fluid.

44. (Withdrawn and Currently Amended) The material composition according to claim 43, wherein the nematic fluid is an elastomeric gel.

45. (Currently Amended) The material composition according to claim 1, wherein the material is in the form of a tissue engineering scaffold.

46. (Withdrawn and Currently Amended) The material composition according to claim 45, wherein the scaffold is seeded with cells.

47. (Withdrawn and Currently Amended) The material composition according to claim 46, wherein the cells are ligamentum cells for growing new ligaments, tenocytes for growing new tendon, chondrocytes for cartilage, osteoblasts for bone, cardiac cells for cardiac tissue engineering, stromal cells for tissue patches, fibroblasts and keratinocytes for skin and mesenchymal stem cells for any of these applications.

48. (Withdrawn and Currently Amended) The material composition according to claim 1, wherein the material composition possess one or more of high tensile strength at low weight, high modulus, high chemical resistance, high toughness, high cut resistance, low elongation to break, low thermal shrinkage, high dimensional stability, flame resistant, or self extinguishing.

49. (Withdrawn and Currently Amended) The material composition according to claim 1, wherein the fibres possess characteristics selected from the following: continuous filament yarn, high tensile strength, processable on conventional looms, twisters, cord forming, stranding and serving equipment; staple, very high cut resistance, spun on conventional cotton or worsted spinning equipment, precision cut short fibres, processable on felting and spun lace equipment; pulp-wet and dry, floc, precision cut short fibres, high surface area, miscible in blend composites, thermal resistance, excellent friction and wear resistance; cord, high tensile strength and modulus at low specific weight, retention of physical properties at high and low temperature extremes, very low heat shrinkage, very low creep, good fatigue resistance; fabric, excellent ballistic performance at low weights; and excellent resistance to cuts and protrusion combined with comfortable wear and excellent friction and wear performance against other materials.

50. (Withdrawn and Currently Amended) The material composition according to claim 1, wherein the material comprises a skin treatment.

51. (Withdrawn and Currently Amended) The material composition according to claim 50, wherein the skin treatment comprises skincare and dermatological applications for cosmetic and/or medical treatment.

52. (Withdrawn and Currently Amended) The material composition according to claim 50, wherein the skin treatment comprises one or more of skin protection, improvement in skin feel, improvement of skin strength, increased suppleness, delivery of active or beneficial substances, moisturisation, improved appearance and/or anti-ageing effects.

53. (Withdrawn and Currently Amended) The material composition according to claim 1, wherein the material composition comprises a hair care product.

54. (Withdrawn and Currently Amended) The material composition according to claim 53, wherein the hair care product improves hair condition, strength, feel, suppleness, appearance and/or moisturisation.

55. (Withdrawn and Currently Amended) The material composition according to claim 54, wherein the hair care product comprises a hair shampoo, conditioner, dye, gel, mousse and/or other dressing.

56. (Withdrawn and Currently Amended) The material composition according to claim 1, wherein the material comprises a network adapted for the delivery of perfumes, vitamins and/or other beneficial agents to the skin and/or hair.

57. (Withdrawn and Currently Amended) The material composition according to claim 56, wherein pH responsiveness is used to control delivery.

58. (Withdrawn and Currently Amended) The material composition according to claim 1, wherein the material is sterilised.

59. – 60. (Canceled)

61. (Withdrawn and Currently Amended) A method of tissue engineering, comprising seeding the material composition of claim 1 with cells.

62. (Canceled)

63. (Withdrawn) The method of claim 61, wherein the method is a method of bone repair.

64. – 68. (Canceled)

69. (Withdrawn and currently amended) A method of sterilising the material composition according to claim 1, comprising gamma irradiation of a dry powder of the material composition.

70. (Canceled)

71. (Withdrawn and currently amended) The material composition according to claim 1, wherein the material composition can modify wetting properties or anti-icing properties of a material, control interaction of oil/water with clay surfaces, stabilize clay, or deal with fractures in oil-wells.

72. (Withdrawn and currently amended) The material composition according to claim 1, wherein the material composition is part of a sensor, biocatalyst or separation media in biotechnology applications.

73. (Withdrawn and currently amended) The material composition according to claim 1, wherein the material composition is part of a bioresponsive and biocompatible surface.

74. – 75. (Canceled)

76. (Withdrawn and currently amended) The material composition according to claim 1, wherein the material composition can serve as a template for nucleation and growth of inorganic materials.

77. - 80. (Canceled)

81. (Withdrawn and currently amended) The material composition according to claim 1, wherein the material composition comprises continuous filament yarns, staple, floc, cord, or fabric.

82. – 95. (Canceled)

96. (Currently amended) The material composition according to claim 1, further comprising a polymer.

97. - 101. (Canceled)

102. (Currently Amended) The material A composition comprising: of claim 1, ribbons, fibrils or fibres, wherein each of the ribbons, fibrils or fibres has an antiparallel arrangement of peptides in a β - sheet tape-like substructure at physiological pH and physiological salt concentrations, wherein each peptide comprises a net -2 or a +2 charge, and wherein the peptide is P11-3; and
a physiological concentration of salt,
wherein the composition is at a physiological pH, and wherein the peptide is at a concentration of higher than 15 mg/ml to 35 mg/ml in the composition.

103. (Currently Amended) The material composition of claim 1, wherein the pH is about 7.5.

104. (Currently Amended) The material composition of claim 1, wherein the salt concentration is about 145 mM NaCl.